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NORTHERN DISTRICT OF CALIFORNIA

UNITED STATES DISTRICT COURT  
NORTHERN DISTRICT OF CALIFORNIA

IXYS CORPORATION,

No. C 02-03942 MHP

Plaintiff,

**MEMORANDUM AND ORDER RE:  
DEFENDANT'S MOTIONS FOR  
SUMMARY JUDGMENT OF NON-  
INFRINGEMENT AND SUMMARY  
JUDGMENT OF INVALIDITY FOR  
OBVIOUSNESS**

v.

ADVANCED POWER TECHNOLOGY, INC.,

Defendant.

AND RELATED COUNTERCLAIMS.

Plaintiff IXYS Corporation ("IXYS") filed this action against defendant Advanced Power Technology, Inc. ("APT"), alleging infringement of two U.S. patents, numbered 5,486,715 (the "'715 patent") and 5,801,419 (the "'419 patent"), that it holds on an improved design for power MOSFET devices. APT has counterclaimed for infringement of its patents, numbered 5,283,202 (the "'202 patent") and 5,262,336 (the "'336 patent"). The parties are now before the court upon APT's motions seeking summary adjudication that its accused products do not infringe IXYS's '715 and '419 patents and summary judgment that IXYS's patents are invalid because obvious. After having considered the parties' arguments and submissions, and for the reasons set forth below, the court rules as follows.

1 BACKGROUND<sup>1</sup>

2 Plaintiff IXYS Corporation and defendant Advanced Power Technology, Inc. are both  
3 semiconductor manufacturing firms that do business in Santa Clara, California. IXYS filed suit  
4 against APT on August 15, 2002, alleging that APT was infringing two related patents detailing an  
5 improved design for “high-frequency power MOSFETs” held by IXYS. On October 1, 2002, APT  
6 counterclaimed against Ixys for infringement of a patent it held that described an improved design  
7 for producing “lifetime control” in semiconductor devices. On January 22, 2004, this court entered  
8 an order construing disputed terms in those three patents. That same day, the court also authorized  
9 APT to amend its counterclaims to add a claim that IXYS had infringed APT’s ‘336 patent. Eleven  
10 days later, APT filed for summary judgment of invalidity with respect to Ixys’s two patents; the court  
11 denied APT’s motion on March 18, 2004. Now before the court are APT’s motions requesting  
12 summary judgment that its accused products do not infringe IXYS’s ‘715 and ‘491 patents, either  
13 literally or under the doctrine of equivalents, and that IXYS’s patents are invalid for reason of  
14 obviousness.  
15

16 LEGAL STANDARD

17 I. Summary Judgment

18 Summary judgment is proper when the pleadings, discovery and affidavits show that there is  
19 “no genuine issue as to any material fact and that the moving party is entitled to judgment as a matter  
20 of law.” Fed. R. Civ. P. 56(c). Material facts are those which may affect the outcome of the case.  
21 Anderson v. Liberty Lobby, Inc., 477 U.S. 242, 248 (1986). A dispute as to a material fact is  
22 genuine if there is sufficient evidence for a reasonable jury to return a verdict for the nonmoving  
23 party. Id. The moving party for summary judgment bears the burden of identifying those portions of  
24 the pleadings, discovery and affidavits that demonstrate the absence of a genuine issue of material  
25 fact. Celotex Corp. v. Cattrett, 477 U.S. 317, 323 (1986). On an issue for which the opposing party  
26 will have the burden of proof at trial, the moving party need only point out “that there is an absence  
27 of evidence to support the nonmoving party’s case.” Id.  
28

1       Once the moving party meets its initial burden, the nonmoving party must go beyond the  
2 pleadings and, by its own affidavits or discovery, “set forth specific facts showing that there is a  
3 genuine issue for trial.” Fed. R. Civ. P. 56(e). Mere allegations or denials do not defeat a moving  
4 party’s allegations. Id.; see also Gasaway v. Northwestern Mut. Life Ins. Co., 26 F.3d 957, 960 (9th  
5 Cir. 1994). The court may not make credibility determinations, Anderson, 477 U.S. at 249, and  
6 inferences to be drawn from the facts must be viewed in the light most favorable to the party  
7 opposing the motion. Masson v. New Yorker Magazine, 501 U.S. 496, 520 (1991).

8       The Federal Circuit applies the same standard for summary judgment. See, e.g., Southwall  
9 Techs., Inc. v. Cardinal IG Co., 54 F.3d 1570, 1575 (Fed. Cir. 1995); Barnag Barmer  
10 Maschinenfabrik AG v. Murata Machinery, Ltd., 731 F.2d 831, 835 (Fed. Cir. 1984). The Federal  
11 Circuit has repeatedly held that summary judgment is as appropriate in patent cases as in any other  
12 type of case. See, e.g., Paragon Podiatry Lab., Inc. v. KLM Lab., Inc., 984 F.2d 1182, 1190 (Fed.  
13 Cir. 1993); Hodosh v. Block Drug Co., 786 F.2d 1136, 1141 (Fed. Cir. 1986).

## 14       II.     Infringement

### 15       A.     Literal Infringement

16       To determine if an accused product infringes a patent, the court must compare the accused  
17 product with the asserted claims of the patent. See Southwall, 54 F.3d at 1575. A product literally  
18 infringes a patent if “every limitation of the patent claim [can] be found in the accused device.” Gen.  
19 Mills, Inc. v. Hunt-Wesson, Inc., 103 F.3d 978, 981 (Fed. Cir. 1997).

### 20       B.     Doctrine of Equivalents

21       A product may be found to infringe under the doctrine of equivalents if the accused device  
22 “performs substantially the same function, in substantially the same way to obtain the same result” as  
23 the claimed invention. Graver Tank & Mfg. Co. v. Linde Air Prods. Co., 339 U.S. 605, 608, 70 S.  
24 Ct. 854, 856 (1950); Warner-Jenkinson Co. v. Hilton Davis Chem. Co., 520 U.S. 17, 35 (1997). “A  
25 device that does not literally infringe a claim may nonetheless infringe under the doctrine of  
26 equivalents if every element in the claim is literally or equivalently present in the accused device.”  
27 Sage Products, Inc. v. Devon Industries, Inc., 126 F.3d 1420, 1423 (Fed. Cir. 1997). “A claim  
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1 element is equivalently present in an accused device if only ‘insubstantial differences’ distinguish the  
2 missing claim element from the corresponding aspects of the accused device.” Id. The Supreme  
3 Court has emphasized that “[e]ach element contained in a patent claim is deemed material to  
4 defining the scope of the patented invention, and thus the doctrine of equivalents must be applied to  
5 individual elements of the claim, not to the invention as a whole.” Warner-Jenkinson, 520 U.S. at  
6 29.

7         The essential inquiry in determining equivalents is whether “the accused product or process  
8 contain[s] elements identical or equivalent to each claimed element of the patented invention.” Id. at  
9 40. One suitable method for making this determination is the “triple identity” test, which requires  
10 the court to focus on “the *function* served by a particular claim element, the *way* that element serves  
11 that function, and the *result* thus obtained by that element.” Id. (emphasis in original). “Although  
12 the presence of equivalents is a factual matter normally reserved for the fact finder, the trial court  
13 should grant summary judgment in any case where no reasonable fact finder could find equivalence.”  
14 Sage Products, 126 F.3d at 1423 (citation omitted).

15         Furthermore, in applying the doctrine of equivalents, the court must also determine the  
16 “range of equivalents to which the claimed invention is entitled, in light of the prosecution history,  
17 the pioneer-nonpioneer status, and the prior art.” Intel Corp. v. U.S. Int’l Trade Com’n, 946 F.2d  
18 821, 842 (Fed. Cir. 1991) (quoting D.M.I., Inc. v. Deere & Co., 755 F.2d 1570, 1575 (Fed. Cir.  
19 1985)). The purpose of examining the prior art in the context of the doctrine of equivalents is to  
20 ensure that the patent holder does not obtain a broader right to exclude the patent under the doctrine  
21 than would have been given by the patent office. Id. Thus, the prior art restricts the extent to which  
22 patent protection can be extended beyond the limitations in the claims. Id.

23         Prosecution history estoppel applies to amendments made to a claim to avoid the prior art, or  
24 to otherwise address special concerns such as obviousness that “arguably would have rendered the  
25 claimed subject unappealable.” Warner-Jenkinson, 520 U.S. at 30-31 (citations omitted). The  
26 Federal Circuit has set forth a three-step process for determining whether a patent holder has  
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1 meaningfully narrowed the scope of the patent through amendment, thus invoking prosecution  
2 history estoppel. First, a court must decide “whether an amendment filed in the Patent and  
3 Trademark Office (‘PTO’) has narrowed the literal scope of a claim.” Festo Corp. v. Shoketsu  
4 Kinzoku Kogyo Kabushiki Co., Ltd., 344 F.3d 1359, 1366 (Fed. Cir. 2003) (en banc) (citing Pioneer  
5 Magnetics, Inc. v. Micro Linear Corp., 330 F.3d 1352, 1356 (Fed. Cir. 2003)). “If the amendment  
6 was not narrowing, then prosecution history estoppel does not apply.” Id. If, however, the court  
7 finds that the amendment did narrow the literal scope of the claims, it must proceed to the second  
8 step of the process and evaluate “whether the reason for that amendment was a substantial one  
9 relating to patentability.” Id. “If the patentee successfully establishes that the amendment was not  
10 for a reason of patentability, then prosecution history estoppel does not apply.” Id. at 1367. On the  
11 other hand, if the court concludes that the patent was amended for a substantial reason related to  
12 patentability, it must then undertake the third and final step in the process and determine “the scope  
13 of the subject matter surrendered by the narrowing amendment.” Id. The patentee is presumed to  
14 have surrendered “all territory between the original claim limitation and the amended claim  
15 limitation,” though she “may rebut that presumption of total surrender” as to particular equivalents.  
16 Id. (citing Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., Ltd., 535 U.S. 722, 740 (2002)).

18  
19 III. Obviousness

20 35 U.S.C. § 103(a) provides that:

21 A patent may not be obtained though the invention is not identically disclosed or described as  
22 set forth in section 102 of this title, if the differences between the subject matter sought to be  
23 patented and the prior art are such that the subject matter as a whole would have been  
obvious at the time the invention was made to a person having ordinary skill in the art to  
which said subject matter pertains.

24 In a motion for invalidity on grounds of obviousness, the moving party “must show prior art  
25 references which alone or combined with other references would have rendered the invention  
26 obvious to one of ordinary skill in the art at the time of the invention.” AI-Site Corp. v. VSI, Int’l,  
27 Inc., 174 F.3d 1308, 1323 (Fed. Cir. 1999) (citations omitted). If more than one prior art reference is  
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1 employed, “there must be some suggestion for [combining prior art references], found either in the  
2 references themselves or in the knowledge generally available to one of ordinary skill in the art.” In  
3 re Jones, 958 F.2d 347, 351 (Fed. Cir. 1992). The “presumption of validity under 35 U.S.C. § 282  
4 carries with it a presumption that the Examiner did his duty and knew what claims he was allowing.”  
5 Intervet Am., Inc. v. Kee-- Vet Labs., Inc., 887 F.2d 1050, 1054 (Fed. Cir.1989). By consequence,  
6 the movant’s “burden is especially difficult when the prior art was before the PTO examiner during  
7 prosecution of the application.” Hewlett-Packard Co. v. Bausch & Lomb Inc., 909 F.2d 1464, 1467  
8 (Fed. Cir. 1990).

9         Whether a patent is invalid for obviousness is a question of fact to be determined by  
10 reference to: (1) the scope and content of the prior art; (2) differences between the prior art and the  
11 claims at issue; (3) the level of ordinary skill in the art; and, if necessary, (4) secondary evidence of  
12 non-obviousness. Graham v. John Deere Co., 383 U.S. 1, 17-18 (1966). Secondary evidence of non-  
13 obviousness can include the commercial success of the invention, long-felt but unsolved need,  
14 failure of others to solve the problem, licensing of the patented invention, professional recognition  
15 and approval, or copying of the invention. Id.; Minnesota Mining & Mfg. Co. v. Johnson & Johnson  
16 Orthopaedics, Inc., 976 F.2d 1559, 1573 (Fed. Cir. 1992).

17         An accused infringer bears the burden of proving invalidity for reason of obviousness by  
18 clear and convincing evidence. See Monarch Knitting Mach. v. Sulzer Morat GMBH, 139 F.3d 877,  
19 881 (Fed. Cir. 1998). When “the defendant in a patent infringement case moves for summary  
20 judgment on an affirmative defense, the elements of which the defendant must prove by clear and  
21 convincing evidence, the non-moving party must simply produce enough evidence to allow a rational  
22 trier of fact to find that there is not clear and convincing evidence.” Chiron Corp. v. Abbott  
23 Laboratories, 902 F. Supp. 1103, 1110 (N.D. Cal. 1995) (Patel, J.).  
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1 DISCUSSION

2 I. Literal Infringement

3 IXYS has not seriously contested APT's argument that none of the accused devices possesses  
4 a second metallization layer overlying the entirety of the insulating layer, and thus that summary  
5 judgment of literal non-infringement is warranted. IXYS has presented this court with no indication  
6 that APT's accused devices meet the "overlying" limitation, regardless of which of the parties'  
7 quantifications of "overlying the entirety" this court selects. In light of this fact, the court hereby  
8 grants summary judgment that APT's products do not literally infringe IXYS's '419 and '715  
9 patents.  
10

11 II. Infringement by the Equivalents

12 A. Prosecution History Estoppel

13 Before it was issued as the '715 patent, IXYS's original patent application was first rejected  
14 by the patent examiner as indefinite under 35 U.S.C. § 112 ¶ 2. Feeman Dec., Exh. 5, at 2. In  
15 specifying his reasons for rejecting the claims, the patent examiner asked: "[A]re the first and second  
16 metallization layers, which constitute the gate bus and the source bus, respectively, electrically  
17 shorted to each other or merely formed at a second level of metallization?" Id. In response, IXYS  
18 amended what would become claim 1 of the '715 patent<sup>2</sup> to read "a second metallization layer  
19 comprising a gate bus and a source bus overlying at least said insulating layer." Id., Exh. 6, at 1.  
20 The inventor explained further that "[t]he gate bus portion of the second metallization layer contacts  
21 the first metallization layer through a gate contact opening in an insulation layer." Id. at 4.  
22

23 In determining whether IXYS surrendered claim scope relevant to this motion during  
24 prosecution of its patent, this court must consider each distinct limitation of the claim separately.  
25 See Ericsson, Inc. v. Harris Corp., 352 F.3d 1369, 1375 (Fed. Cir. 2003) ("... the equivalence  
26 question relates to whether 'the speech signal amplifiers... only supply power to the telephone set'  
27 when the receiver is off-hook. That limitation was never amended and therefore cannot be subject to  
28

1 the Festo presumption.”) (second ellipsis in original); Pioneer Magnetics, 330 F.3d at 1356  
2 (“Prosecution history estoppel serves to limit the doctrine of equivalents by denying equivalents to a  
3 claim limitation whose scope was narrowed during prosecution for reasons related to patentability.”);  
4 ACLARA Biosciences, Inc. v. Caliper Tech. Corp., 125 F. Supp. 2d 931, 402-403 (N.D.C.A. 2000)  
5 (Breyer, J.) (“... prosecution history estoppel under Festo must be applied individually to each of the  
6 limitations, not to the ‘plurality of electrodes’ clause as a whole.”).

7 Before amendment, claim 1 of the ‘715 patent contained two separate limitations: 1) there  
8 must exist a second metallization layer, and 2) that second metallization layer must overly at least the  
9 insulating layer. Feeman Dec., Exh. 6, at 1. As amended, the claim involves three limitations:

- 10 1. a second metallization layer
- 11 2. that second metallization layer comprising a gate bus and a source bus
- 12 3. that second metallization layer overlying at least the insulating layer.

13 ‘715 patent, claim 1. The amendment thus served only to add an additional limitation—the gate bus  
14 and source bus requirement—not to modify the requirement that the second metallization layer  
15 overly at least the insulating layer. This modification maps directly onto the patent examiner’s § 112  
16 rationale for rejecting the claims, explaining that the gate bus and source bus are both formed in the  
17 second metallization and are not shorted to one another. Feeman Dec., Exh. 5, at 1. In the course of  
18 this amendment, IXYS therefore surrendered claim scope relating to the “gate bus and source bus”  
19 limitation, not the “overlying said insulating layer” limitation, which remained unchanged. Since  
20 neither party debates that the APT devices literally meet the source and gate bus limitation,  
21 prosecution history estoppel is not relevant here.<sup>3</sup>

22  
23 B. “Insubstantial Differences” Analysis

24 For the predominant thrust of its analysis of equivalents, this court will employ the  
25 “insubstantial differences” test, which the Federal Circuit appears to favor, but will pay particular  
26 heed to the “function,” “means,” and “result” of each claim element, as suggested in Warner  
27 Jenkinson. See Toro Co. v. White Consolidated Industries, Inc., 266 F.3d 1367, 1370 (Fed. Cir.



1 2001).<sup>4</sup> For the purposes of determining whether IXYS's patents are infringed under the doctrine of  
2 equivalents, the only claim limitation in question for purposes of this analysis is the "second  
3 metallization layer... overlying at least said insulating layer." '715 patent, claim 1. The parties  
4 appear to agree that the remainder of the claim limitations are literally fulfilled.

5 In conducting this analysis, the court must first ascertain the function or functions of IXYS's  
6 second metallization layer. Such an inquiry "entails an examination of the claim and the explanation  
7 of it found in the written description of the patent." Vehicular Tech. Corp. v. Titan Wheel Int'l, 141  
8 F.3d 1084, 1090 (Fed. Cir. 1998) (citing Applied Materials, Inc. v. Advanced Semiconductor  
9 Materials Am., Inc., 98 F.3d 1563, 1574 (Fed. Cir. 1996)). The court is nevertheless mindful of the  
10 Federal Circuit's admonition that "[a]n invention claimed in purely structural terms generally resists  
11 functional limitation." Toro, 266 F.3d at 1371 (limiting the "function" of a claim limitation, for  
12 purposes of determining infringement according to the doctrine of equivalents, to that function  
13 specifically disclosed in the language of the claim itself).<sup>5</sup>

14  
15 1. First and Second Metal in APT's Devices

16 The '715 patent specification discloses a number of different functions performed by the  
17 second metallization layer. In the "Summary of Invention" section, under the sub-heading that  
18 describes improved embodiments of the device, the patent explains that the second metallization  
19 layer "provides source contacts **102** and a common source bus **105**." '715 patent, 5:32-33. In  
20 addition, the "second metallization layer has a gate bus connecting the first metallization layer to a  
21 common gate pad." '715 patent, 57-59. APT thus argues that a principal function of the second  
22 metal in the '715 and '419 patents is to contact the source regions of the substrate and "collect"  
23 current from those regions. In addition, APT claims that this metal "must be coextensive with the  
24 active area," implying that it must 1) reach all active source regions, and 2) overly the entirety of the  
25 substrate's active area. A second "function" of IXYS's second metallization layer, explains APT, is  
26 to conduct gate current to the gate electrodes through a gate bus that is separated from the source  
27 bus; this activity, APT's expert believes, must take place outside of the active area. Shenai Dec. ¶¶  
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1 11 & 12. Most importantly, APT goes to great length to illustrate the fact that both contacts to  
2 source regions and source and gate buses in its devices are formed through the *first* metallization  
3 layer, Tsang Dec. ¶ 12, and thus that APT's devices are operable with only the first metal layer  
4 intact.<sup>6</sup> APT reasons that the second metal in its accused devices does not fulfill the same function  
5 as IXYS's second metal structure, and argues that this functional difference precludes IXYS from  
6 proving infringement by the equivalents.

7 IXYS's principal argument by way of reply is that APT has improperly imported imagined  
8 "functions" from the specifications into the claims for the purposes of the infringement analysis, in  
9 violation of the venerable patent maxim prohibiting such relations. See, e.g., Toro, 266 F.3d at  
10 1371. However, the court need not address the question of whether these functional distinctions  
11 proposed by APT are properly part of the claims, because a reasonable fact-finder could conclude  
12 that the asserted differences are wholly insubstantial.

13 As an initial matter, APT's argument that the functions allegedly performed by IXYS's  
14 second metallization layer are performed in part by APT's first metallization layer and in part by  
15 APT's second metallization layer does not present a bar to IXYS's ability to prove infringement by  
16 equivalents. A jury is capable of finding infringement where one claim element of the patented  
17 invention fulfills a role satisfied by two or more structures in an accused device. See Dolly, Inc. v.  
18 Spalding & Evenflo Cos., 16 F.3d 394, 398 (Fed. Cir. 1994) ("An accused device may infringe under  
19 the doctrine of equivalents even though a combination of its components performs a function  
20 performed by a single element in the patented invention."). Furthermore, even if the IXYS patent  
21 required that the source metal portions of the second metallization layer overlie the active area  
22 completely,<sup>7</sup> an APT device that failed to do the same would not necessarily be substantially  
23 different; a reasonable jury could conclude that such topographical differences introduce no  
24 functional distinction between APT's devices and the patents. Likewise, APT has provided no basis  
25 for believing that a device with a gate bus over the active region (such as its own) could not be found  
26 to be equivalent to a patent that required that the gate bus (or the spacing between the gate and  
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1 source buses) exist over non-active areas of the device. These are paradigmatic “insubstantial  
2 differences,” Sage Products, 126 F.3d at 1423, and a reasonable jury could conclude that APT’s  
3 accused devices infringe under the doctrine of equivalents despite their existence.

4       However, if these were the only differences between the accused devices and IXYS’s  
5 patented inventions, IXYS would be prevented from proving infringement by the equivalents as a  
6 matter of law, as APT’s prior art device (the “208”) also possesses first and second metallization  
7 layers that perform the functions described above. See Tsang Dec. ¶¶ 6 & 12-13; see generally IXYS  
8 Corp. v. Advanced Power Technology, Inc., 2004 WL 540513 (N.D.C.A. 2004) (Patel, C.J.)  
9 (Memorandum and Order Re: APT’s Motion for Summary Judgment of Invalidity). Indeed, with  
10 respect to these functions, APT’s prior art and APT’s accused devices are entirely equivalent.  
11 See id. IXYS cannot claim infringement under the doctrine of equivalents against a device if to do  
12 so would necessarily “ensnare prior art” that employs similarly “equivalent” structures. Marquip,  
13 Inc. v. Fosber America, Inc., 198 F.3d 1363, 1367 (Fed. Cir. 2000); see also Wilson Sporting Goods  
14 Co. v. David Geoffrey & Assoc., 904 F.2d 677, 684 (Fed. Cir. 1990) (“a patentee should not be able  
15 to obtain, under the doctrine of equivalents, coverage which [s]he could not lawfully have obtained  
16 from the PTO by literal claims.”).

## 17                   2.       Improved Current Flow

18       By consequence, if IXYS’s claims of infringement are to survive, IXYS must uncover a  
19 characteristic according to which its patented invention and the allegedly infringing devices differ  
20 only “insubstantially,” but one that is also sufficiently distinct from the prior art that it would have  
21 been non-obvious, and thus patentable, in light of that prior art. See id. According to one  
22 formulation suggested by the Federal Circuit, there must exist a “hypothetical claim,” similar to the  
23 actual patent claim, that would both “cover literally the accused device” and have been patentable  
24 (and of particular relevance here, non-obvious) over prior art. Id.; see also Key Mfg. Group, Inc. v.  
25 Microdot, Inc., 925 F.2d 1444, 14449 (Fed. Cir. 1991). It is thus IXYS’s description of the function  
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1 of its second metallization layer, and IXYS's attempts to distinguish its patented invention from  
2 APT's prior art, that raise the more significant questions here.

3 For the purposes of this motion, IXYS's approach to the question of "insubstantial  
4 differences" has been to measure the proportion of the insulating layer covered by the second  
5 metallization layer in APT's various devices and compare that percentage with the claim  
6 construction order's requirement that the second metallization layer completely overlie the insulating  
7 layer (i.e. cover 100% of the insulating layer).<sup>8</sup> See Blanchard Rep. ¶¶ 59-65. According to Dr.  
8 Blanchard, IXYS's expert, the second metals of APT's 208 and 208x devices, which are indisputably  
9 prior art, cover 1.821% and 2.472% of the insulating layers of those devices, respectively. Id. ¶ 65.  
10 Dr. Blanchard calculated the second metal coverage of APT's 526 die—which may or may not be  
11 prior art<sup>9</sup>—at 46.14%. Id. By contrast, Dr. Blanchard's states that the second metal of APT's  
12 accused infringing device, the 546, covers 80.48% of that device's insulating layer.<sup>10</sup> Id.  
13 Unsurprisingly, IXYS argues that the discrepancy between 80.48% and 100% or 93% is  
14 insubstantial, while the distance between 1.821% and 93% is sufficiently substantial to separate the  
15 '715 and '419 patents from the prior art.

16 Numerical discrepancies are not, in and of themselves, a basis for determining that a device  
17 does not infringe under the doctrine of equivalents, particularly where the numerical discrepancy  
18 plays no meaningful functional role. See, e.g., Hilton Davis Chem. Co. v. Warner-Jenkinson Co.,  
19 114 F.3d 1161, 1163-64 (Fed. Cir. 1997) (finding that patent specifying pH "from approximately 6.0  
20 to 9.0" may be infringed by a process that takes place at a pH of 5.0); Abbott Labs. v. Dey, L.P., 287  
21 F.3d 1097, 1105-1106 (Fed. Cir. 2002). Concomitantly, however, it is not immediately clear why  
22 the coverage gap between the APT 208 and the IXYS patents is sufficiently large or significant to  
23 separate IXYS's patented invention from those earlier devices. See Market St. Cable Ry. Co. v.  
24 Rowley, 155 U.S. 621, 629 (1895) ("... a mere carrying forward of the original thought—a change  
25 only in form, proportions, or degree, doing the same thing in the same way, by substantially the same  
26 means, with better results—is not such an invention as will sustain a patent.") (citations omitted). In  
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1 accord with the “function-way-result” test, this court must look not merely to the amount of second  
2 metal coverage but to the function of that claim limitation within IXYS’s patented invention.

3 Addressing this question, IXYS avers that the “claimed function of the second metallization  
4 layer is improved current flow;” in other words, sufficiently large second metal coverage facilitates  
5 the rapid movement of current from an outside power source, through the second metallization layer,  
6 and to the source regions and the gate first metal, enabling the device to be “switched” (turned on  
7 and off) with greater alacrity. See Pl. Opp., at 14. The patent provides some support for IXYS’s  
8 contention in its description of the interaction between the gate bus and the first gate metal:

9 “Thus, the improved device provides a medium comprising substantially metallization for  
10 signal propagation. In particular, the signal activating the device propagates from the gate  
11 pad through the gate bus (or second metallization), and then through the first metallization  
12 layer to turn-on and turn-off the device. This embodiment reduces resistance R and  
13 capacitance C by relying upon metallization interconnects instead of polysilicon, and  
14 therefore reduces the RC factor of the prior art device. As such, the improved device  
15 provides improved switching capabilities.

16 ‘715 patent, 2:36-46.

17 The improved device relies upon this combination of the first and second metallization layer  
18 for facilitating device turn-on and turn-off. The signal propagates from the metal gate pad  
19 through the metal gate bus (or portion of second metallization layer), and then through the  
20 first metallization layer to turn-on or turn-off the device. Since the signal propagates  
21 substantially through metallization rather than the resistive polysilicon layer of the prior art,  
22 switching performance is improved.

23 Id. at 6:37-46.

24 While these portions of the specifications do identify improved switching speed as an  
25 improvement of the invention over the prior art, they do not explicitly assign responsibility for this  
26 improvement to the augmented second metallization coverage. On the contrary, the improvement in  
27 switching speed appears to stem from the fact that the switching signal is now propagating through  
28 two layers of metallization, and not through polysilicon, rather than anything having to do with the  
degree of second metal coverage. Id. at 42-44 (“This embodiment reduces resistance R and  
capacitance C by relying upon metallization interconnects instead of polysilicon....”). Indeed, the  
size of the second metallization layer is nowhere mentioned within the specifications. Nevertheless,  
the “second metallization layer... overlying at least said insulating layer,” the claim limitation at issue

1 here, is described as helping—in concert with other aspects of the claimed invention—to produce  
2 this improved switching speed. The specifications do not describe the precise manner in which  
3 IXYS alleges that it does so, but the Federal Circuit has not gone so far as to require such specifics.  
4 See Vehicular, 141 F.3d at 1089-91. IXYS has therefore put forth an adequate showing that  
5 “improved current flow” is a function of the claim limitation at issue here.

6 IXYS argues that a device with sufficient second metal to realize improved current flow  
7 would infringe its patents, whereas a device (such as APT’s prior art) lacking a higher proportion of  
8 second metal coverage, and thus failing to offer improved current flow, would not be swept up  
9 within IXYS’s patents’ ambit. Not surprisingly, IXYS’s and APT’s experts disagree regarding the  
10 efficacy of higher proportions of second metal in improving current flow and switching speed, and  
11 consequently dispute whether improved current flow could even be the purpose for increasing the  
12 proportion of second metal coverage. Dr. Blanchard, IXYS’s expert, opines that the “function of the  
13 second metallization layer that overlaps the insulating layer is improved current flow in the second  
14 metal bus regions,” and notes that the “second metallization layer in [APT’s] MOS V, VI, and VII  
15 devices... (1) overlies a high percentage of the insulating layer... and (2) acts to improve the flow of  
16 current, making high frequency operation possible.” Blanchard Rep., ¶ 70 & 73; see also id. ¶ 58  
17 (arguing that the large second metal coverage of APT’s accused devices must have some purpose  
18 beyond functioning merely as bonding pads). Dr. Blanchard implies also that APT’s prior  
19 generations of device—due to their comparative lack of second metal coverage—would fail to  
20 enable similar high frequency operation.<sup>11</sup> See id. at ¶ 68 (APT’s “prior art did not disclose  
21 structures where the second metallization layer overlies a high percentage of the insulating layer.”).

22 In stark contrast, APT’s expert, Dr. Krishna Shenai, strenuously disputes Dr. Blanchard’s  
23 contention that the proportion of second metal coverage has any bearing upon current flow. Explains  
24 Dr. Shenai, “[t]he APT second metal pads contribute a vanishingly small amount of the APT  
25 devices’ resistance to current flow, and thus they are vastly larger than they need to be for this  
26 purpose. Furthermore, increasing the second metal overlying the active area actually retards high  
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1 frequency operation, because it increases input capacitance.” Shenai Dec. ¶ 34. Dr. Shenai’s  
2 opinion squares with calculations performed and reported by Dr. Dah Wen Tsang, APT’s Vice  
3 President for Engineering and Research and Development. According to his declaration, Dr. Tsang  
4 performed a number of experiments in which he reduced the amount of second metal on the APT  
5 546 (an accused device) and determined that doing so lowered the “input capacitance” of the second  
6 metallization layer, “unquestionably result[ing] in *faster* switching speeds for the design with *less*  
7 overlap of second metal on active area, not the design with more overlap as Dr. Blanchard states.”  
8 Tsang Dec. ¶ 40 (first emphasis added, second emphasis in original).<sup>12</sup> At one point during his  
9 deposition, however, Dr. Tsang appeared to contradict this position and indicate that a desire to  
10 increase switching speed may have catalyzed APT’s interest in increasing the overlay of second  
11 metal in its later devices. See Tsang Dep., at 196 (discussing the earlier 526 device and explaining  
12 that “there is a delay from one gate pad to the rest of the device. And we have a practice of  
13 instructing our customers if they want fast switching, they can bond to both gates.”).

14  
15 Although the court is troubled by the fact that Dr. Blanchard’s opinions regarding improved  
16 current flow through enhanced second metallization coverage do not appear to be undergirded by  
17 calculations (or, at the very least, he does not report these calculations), his expert opinion is enough  
18 to raise a triable issue of fact. The parties’ experts have presented ineluctably conflicting opinions,  
19 and this court may not—upon a motion for summary judgment—make the type of credibility  
20 determinations necessary to resolve such conflicts. Anderson, 477 U.S. at 249. The court thus finds  
21 that a reasonable juror could believe that the “second metallization” claim limitation of the ‘715 and  
22 ‘419 patents<sup>13</sup> performs the function of improving current flow, and that this function is similarly  
23 performed by APT’s accused devices but not by the prior art. As such, a hypothetical claim such as  
24 “overlying at least 50% of the insulating layer and providing improved current flow due to the larger  
25 proportion of second metal” would conceivably be literally infringed by APT’s accused devices, but  
26 would not impermissibly capture the prior art.

1 The question nevertheless remains whether increasing the amount of second metallization  
2 coverage in order to improve current flow—and thus such an hypothetical claim—would have been  
3 obvious in light of prior art. In addition to rendering this hypothetical claim unpatentable and  
4 preventing IXYS from proving infringement by the equivalents, see Wilson Sporting Goods, 904  
5 F.2d at 684, a finding of obviousness would invalidate IXYS’s patents. It is at this point that APT’s  
6 motions regarding non-infringement and invalidity coalesce, and the court will consider them here as  
7 an ensemble.

8  
9 II. Obviousness

10 IXYS’s expert, Dr. Richard Blanchard, has opined that as of 1993, the year the IXYS patents  
11 were granted, one of ordinary skill in the field encompassed by those patents would be “an electrical  
12 engineer with a B.S.E.E. degree and two to five years’ experience in the design of power  
13 semiconductor devices, or could be an electrical engineer with an M.S.E.E. degree with one to three  
14 years’ experience. Blanchard Rebuttal Rep. ¶ 7.e.iii. APT has not disputed this assessment. The  
15 court will thus adopt Dr. Blanchard’s estimation as the applicable level of skill here, and all  
16 subsequent references to what a prior art reference might teach or suggest—or to what has been  
17 rendered obvious by the prior art—are made with regard to what an individual with this level of skill  
18 would have understood.

19  
20 A. Scope and Content of Prior Art With Respect to the Claims at Issue

21 APT has assembled a broad array of prior art references, including patents, marketed devices,  
22 and published articles that—when assembled in various combinations—it believes render IXYS’s  
23 ‘419 and ‘715 patents obvious. In addition to debating APT’s contentions on their merits, IXYS  
24 argues that APT has failed to produce these prior art references in a timely fashion, or has failed to  
25 disclose the combinations it claims invalidate its patents, all in violation of Local Patent Rule 3-3. In  
26 its analysis of this issue, the court will confine its consideration to only several of the earliest-



1 disclosed and best-known pieces of prior art, as these prior art references are both representative of  
2 the body of art as a whole and, as the subsequent discussion will show, dispositive of APT's motion.

3 APT's 208 and 208x devices are undisputed prior art to the IXYS patents. Moreover, these  
4 devices *literally contain* every claim limitation of those patents save one: The second metallization  
5 layers of those devices do not overly the entirety of the insulating layers, as required by independent  
6 claims 1 and 23 of the '715 patent, and 1 and 11 of the '419 patent. See generally IXYS Corp. v.  
7 Advanced Power Technology, Inc., 2004 WL 540513 (N.D.C.A. 2004) (Patel, C.J.) (Memorandum  
8 and Order Re: APT's Motion for Summary Judgment of Invalidity).<sup>14</sup> APT's motion for summary  
9 judgment of invalidity for obviousness thus turns on whether there exist other prior art references  
10 (and the suggestion to combine them with the 208 and 208x) that would have made it obvious for  
11 one skilled in the art to extend the coverage of this second metallization layer over the entirety of the  
12 insulating layer. See Al-Site, 174 F.3d at 1323. Importantly, APT's 208 device was not before the  
13 patent examiner who granted IXYS's patents, and thus a presumption of validity of those patents as  
14 non-obvious over the 208 does not attach. See Hewlett-Packard, 909 F.2d at 1467.<sup>15</sup>

15 Discussion of a second and third reference that might—when combined with the 208  
16 device—render obvious complete second metal coverage begins and ends with the familiar Korman  
17 and Jones patents, as well as the admitted prior art cited in Figures 1A through 1C of the '715 and  
18 '419 patents themselves ("the IXYS admitted prior art"). Korman discloses a power MOSFET  
19 device that employs a substantial layer of metal deposited on top of an insulating layer that itself  
20 covers the gate and channel regions of the transistor. See Helou Dec., Exh. 1, at 2 (Korman patent,  
21 U.S. Patent No. 5,119,153) (Figure 1). Though not precisely a "top" view, the Korman figure is a  
22 three-dimensional cross-section of the device that offers a depth-wise view of the device structure  
23 and displays the upper metal layer covering the entirety of the insulating layer (indeed, covering the  
24 entire device). Id. The written description of this patent even ties this metallization layer to the need  
25 for improved conductivity in a fashion no less direct than that of the '715 and '419 patents. The  
26 "Object of the Invention" section of the patent states: "Another object is to provide a minimum cell  
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1 size, multi-cellular field effect power device structure with a high conductivity portion of the body  
2 region in contact with the source electrode.” Korman patent, 2:38-41; id. at Figure 1 (showing this  
3 upper metallization layer providing source contacts).

4 IXYS raises a number of objections to the analogy between this broad metallization layer and  
5 the second metallization layer described in the claims of its patents. First, IXYS argues that this  
6 layer of metal is not truly a “second metallization layer,” because the Korman invention does not  
7 utilize a “first metallization layer” deposited over the gate polysilicon—Korman teaches depositing a  
8 layer of metal silicide, rather than metal, over the gate polysilicon. As an initial matter, IXYS is not  
9 entirely correct; the Korman patent does not exclude the use of metal overlying the gate polysilicon,  
10 and thus in some embodiments the upper metallization layer may indeed be a “second metal.” See  
11 id. at 2:65-67 (“Such devices preferably include a similar metal or metal-silicide layer disposed on  
12 the surface of the gate polysilicon.”). Likewise, although Korman’s broad metallization layer does  
13 not specifically include a source or gate bus, the upper metallization layer plays essentially the role  
14 of a source bus (the gate bus, if it exists, is apparently located elsewhere) and bears an extremely  
15 strong structural resemblance to the IXYS patents’ second metallization layer. Compare id. at Figure  
16 1, with Helou Dec., Exh. 2, at Figure 2A (IXYS patent figure). Indeed, Korman’s broad  
17 metallization even performs a function, viz., conduction of current directly to the source regions, that  
18 IXYS’s second metal performs but that the APT 208 does not; in this sense, Korman’s second metal  
19 is even a closer analogue to IXYS’s than is APT’s. See Helou Dec., Exh. 4, at Figure 1.

20  
21 IXYS’s most meritorious argument is its claim that the Korman patent does not actually  
22 supply the necessary feature: The upper metallization layer of the Korman patent does not  
23 necessarily overly the entirety of Korman’s insulating layer, and no “top view” drawing of the patent  
24 or written description exists to prove conclusively that the metallization layer so covers the device.  
25 See generally id. Yet a party attempting to prove invalidity for obviousness need not demonstrate  
26 that one or more prior art references *literally contain* all of the claim elements and limitations in the  
27 patents alleged to be invalid. The moving party need only establish that the prior art “would have  
28

1 rendered the invention obvious to one of ordinary skill in the art at the time of invention.” Al-Site,  
2 174 F.3d at 1323. Whereas a claim of invalidity for anticipation must necessarily focus upon  
3 whether claim limitations are met literally by the prior art, an obviousness analysis requires a more  
4 holistic approach encompassing a general examination of the prior art and an analysis of the degree  
5 to which they prefigure or *suggest* the patent claims at issue. Compare Scripps Clinic & Research  
6 Foundation v. Genetech, Inc., 927 F.2d 1565, 1576 (Fed. Cir. 1991) (holding that invalidity for  
7 anticipation requires that all of the elements and limitations of the challenged claim are found within  
8 a single prior art reference), with Al-Site, 174 F.3d at 1323.<sup>16</sup> With this standard in mind, the court  
9 finds that APT has shown, by clear and convincing evidence, that Korman teaches—in the interests  
10 of improved conductivity—an extensive upper metallization layer that provides source contacts and  
11 covers the underlying insulating layer without limitation, up to and including overlying that  
12 insulating layer in its entirety, rendering obvious the “overlying the insulating layer” claim  
13 limitation. See Helou Dec., Exh. 4; Graham, 383 U.S. at 17-18.

14  
15 These teachings are further reinforced and recapitulated by the Jones patent, U.S. Patent No.  
16 5,164,802. Jones teaches a “monolithic” MOSFET device in which a multitude of active regions are  
17 combined through the use of a uniform source metal layer that appears to overly nearly all of the  
18 upper surface of the substrate. See Helou Dec., Exh. 3, at Figure 3. In similar fashion to the Korman  
19 patent, this upper metallization layer does not necessarily include a source bus and a gate bus,  
20 although the relevant figure does identify openings for gate connections alongside the source metal  
21 and also includes parts labeled “G1 Metal” and “G2 Metal,” which may constitute upper gate  
22 metallizations. See id. at Figure 3; id. at 5:31-35 (“**26** is an opening for the gate terminal metal  
23 connection to the gate of the VDMOS to contact the drain of the lateral MOSFET, and **28** is an  
24 opening for gate terminal metal to contact the gate electrode of the VDMOS.”).

25 Much like Korman, the Jones patent does not decisively demonstrate that the upper  
26 metallization layer necessarily extends to all corners of the device or covers every square micron of  
27 the insulating layer beneath it. See id. at Figure 3.<sup>17</sup> Despite this fact, the extensive coverage of the  
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1 upper metallization layer in Jones indicates that no restriction on the amount of metal coverage was  
2 believed inherent to the functioning of a multi-cellular MOSFET device, nor required for such a  
3 device, nor necessarily even desirable; a device may function properly, or even preferably, with the  
4 addition of a limitless amount of second metal coverage. The court finds that APT has shown, by  
5 clear and convincing evidence, that Jones, alongside Korman, suggests an upper metallization layer  
6 that conducts current to the source and overlies an indefinitely large proportion of the device, up to  
7 and including the entirety of the insulating layer beneath it, rendering obvious the “overlying the  
8 insulating layer” claim limitation of the IXYS patents. Graham, 383 U.S. at 17-18.

9 In similar fashion, the IXYS admitted prior art teaches a power MOSFET device with an  
10 extensive upper metallization layer that provides source contacts and includes a source bus and gate  
11 bus. See Helou Dec., Exhs. 1 & 2, Figures 1A - 1C & 3:5-65. In fact, this prior art, which bears a  
12 strong resemblance to the Korman invention, lacks only the first metallization structure of IXYS’s  
13 patented invention.<sup>18</sup> See generally id. IXYS is again correct that this prior art device is not  
14 precisely a “double metal” device (as there is no first metallization), and Figure 1C does not  
15 demonstrate conclusively that the second metallization layer overlies the entirety of the insulating  
16 layer. Regardless, in precisely the same fashion as Korman this prior art teaches a MOSFET device  
17 with broad upper metallization coverage, including source metal that is coextensive with the active  
18 area. Id. at Figure 1C. Congruently, the court finds that APT has shown, by clear and convincing  
19 evidence, that the admitted prior art the ‘715 and ‘419 patents suggest a MOSFET with a polysilicon  
20 gate layer and an upper metallization layer that conducts current to the source and overlies an  
21 indefinitely large proportion of the device, up to and including the entirety of the insulating layer  
22 beneath it, rendering obvious the “overlying the insulating layer” and source and gate bus claim  
23 limitations of the IXYS patents. Graham, 383 U.S. at 17-18.  
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1 B. Combination of Korman, Jones, and Admitted Prior Art References with the APT 208

2 When combined, the APT 208 (which contains all of the claim limitations of the '715 and  
3 '419 patents, save a second metallization layer overlying the entirety of the insulating layer) and the  
4 Korman and Jones patents, or the APT 208 and IXYS's admitted prior art, render the '715 and '419  
5 patents obvious to one skilled in the art. The question thus before this court is whether there exists  
6 "some teaching, suggestion, or motivation to combine the references."<sup>19</sup> In re Rouffet, 149 F.3d  
7 1350, 1355 (Fed. Cir. 1998). A court must assiduously scrutinize the knowledge and teaching  
8 available to individuals working in the field at the time of the invention in order to avoid finding  
9 obvious in hindsight what was contemporaneously novel. In re Kotzab, 217 F.3d 1365, 1369 (Fed.  
10 Cir. 2000). Here, three possibilities for the source of this combination present themselves: The  
11 suggestion to combine these prior art references may be inherent to the problem to be solved and the  
12 nature of the nature of the prior art references, may stem from the ordinary knowledge of one skilled  
13 in the art, or may arise from the additional prior art documents presented by APT.<sup>20</sup>

14 1. Inherent Nature of the Prior Art

15 The suggestion to combine prior art references may derive in some cases from "the nature of  
16 the problem to be solved," or may be "implicit from the prior art as a whole." In re Kotzab, 217 F.3d  
17 at 1370. The Korman and Jones patents, the admitted prior art, and the APT 208 are directed  
18 towards the same type of invention, viz., a power MOSFET device, and thus the suggestion to  
19 combine elements of those various prior art references in new combinations is, in some sense,  
20 inherent in the inventions themselves and the nature of the problems they are intended to solve. The  
21 broad second metallization coverage of the Korman patent is linked in that patent's written  
22 description to the issue of conductivity, providing further indication that the prior art references  
23 themselves suggest the relevant combination. See Helou Dec., Exh. 4, at 2:38-41 ("Another object is  
24 to provide a minimum cell size, multi-cellular field effect power device structure with a high  
25 conductivity portion of the body region in contact with the source electrode.").

1 IXYS argues at length that it would be technically impossible to combine the Korman patent  
2 with another prior art device, such as the APT 208, that employs a first metal layer comprising  
3 aluminum. Korman teaches a process that involves reacting the wafer “at a temperature in the range  
4 of from 800°-850°C for a period of 40 minutes,” a fabrication step that would melt a first metal  
5 aluminum layer and render the device unworkable. Id. at 8:9-10; see also Blanchard Rebuttal Rep. ¶  
6 30.b. Yet this hardly prevents one skilled in the art from combining the existing underlying  
7 structures of the APT 208 with the comprehensive upper layer of metallization taught in Korman  
8 (rather than the other way around); Korman’s upper metallization layer, which comprises aluminum,  
9 is entirely compatible with the processes used in manufacturing the 208 device. See Helou Dec.,  
10 Exh. 4, at 9:33-34 (“An aluminum metallization layer is then sputtered onto the wafer surface....”);  
11 Blanchard Rebuttal Rep. ¶ 30.c. (“The only aluminum layer in Korman is deposited after the 800-  
12 900°C densification has been performed.”). In addition, and crucially so, the admitted prior art of the  
13 ‘419 and ‘715 patents do not describe any such high-temperature fabrication processes. See  
14 generally Helou Dec. Exhs. 1 & 2, at 3:5-65. There is thus no reason to believe that a first  
15 metallization aluminum layer—such as that employed by the APT 208—would be incompatible with  
16 these prior art references. Cf. Blanchard Rebuttal Rep. ¶ 30.b.

17  
18 Nevertheless, the inherent compatibility of the Korman patent, the IXYS prior art, and the  
19 APT 208 does not, by itself, constitute clear and convincing evidence of a suggestion within the prior  
20 art to combine those references; the prior art references must do more than obliquely suggest the  
21 combination to pass this high evidentiary threshold. See In re Rouffet, 149 F.3d at 1357  
22 (“Furthermore, rejecting patents solely by finding prior art corollaries for the claimed elements  
23 would permit an examiner to use the claimed invention itself as a blueprint for piecing together  
24 elements in the prior art to defeat the patentability of the claimed invention.”).

1                   2.       General Skill in the Art

2           It is conceivable that the general knowledge of one skilled in the art at the time of the IXYS  
3 inventions would itself render the combination of Korman and Jones with the APT 208 obvious.  
4 “Rarely, however, will the skill in the art component operate to supply missing knowledge or prior  
5 art to reach an obviousness judgment.” Al-Site, 174 F.3d at 1324 (citing W.L. Gore & Assoc., Inc.  
6 v. Garlock, Inc., 721 F.2d 1540, 1553 (Fed Cir. 1983) (“To imbue one of ordinary skill in the art  
7 with knowledge of the invention in suit, when no prior art reference or references of record convey  
8 or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein  
9 that which only the inventor taught is used against its teacher.”)). APT has not offered any specific  
10 evidence, such as through expert testimony, to indicate that the level of general skill in the art was of  
11 a level that such a combination would have been obvious, and the court will not presume such facts  
12 in the absence of particularized proof.

13                   3.       Additional Documents

14                   a.       Combining the APT 208 with Korman and Jones

15           APT has proffered a number of prior art documents—most of them technical articles—that it  
16 believes suggest the combination of APT’s prior art dual-metal devices with the Korman and Jones  
17 patents. These articles describe the design and production of many facets of dual-metal devices and  
18 highlight the fact that such technology was apparently well-known among those skilled in the art  
19 before the time that the IXYS patents were filed and issued. See, e.g., Helou Dec., Exh. 14, at 8.27  
20 (“Semiconductor Technology Handbook”) (“The metal may be used to form a low resistance  
21 interconnection layer to replace either polysilicon or aluminum; it may be deposited selectively over  
22 exposed silicon to lower the sheet resistance of source and drain regions and polysilicon gates....”);  
23 id. Exh. 15, at 902 (“Evolution and Current Status of Aluminum Metallization”) (“In order to exploit  
24 fully the sophisticated device structures and processing which have resulted in substantial reductions  
25 in device size, it is frequently necessary to employ at least two levels of metallization (225). ... The  
26 presence of a second level of metallization requires careful attention to the vias and to crossover  
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1 areas for the two levels.”); *id.* Exh 16, at 1-2 (Neilson Expert Report) (discussing invention and  
2 design of dual metal devices according to varying specifications).

3 Despite the extensive discussion of second metal devices in these articles, none of them  
4 mentions—much less discusses in anything approaching significant detail—the amount of second  
5 metal coverage these devices could, or should, employ. To the contrary, a 1988 article describing an  
6 APT product<sup>21</sup> seems to trace APT’s innovation to the use of a simplified second metal structure that  
7 overlies a lower percentage of the layers below it. *See* Barclay Dec., Exh. 6 (“MOS FET Expands  
8 Envelope for Both Power and Speed”) (“APT’s proprietary self-aligned process—which allows  
9 implantation, diffusion, and etching to be done with a single mask—eliminates this source-metal  
10 overlap and reduces input capacitance, because the source metal does not overlie the gate  
11 structures.”). While this language is hardly decisive at first glance, IXYS’s expert has read it to  
12 teach away from the “overlying the insulating layer” limitation at issue here. *See* Blanchard Rebuttal  
13 Rep. ¶ 35.a.vi. (“Further, the APT design in Cole actively teaches one skilled in the art not to meet  
14 the limitation of a second metallization layer that overlies the entire insulating layer. To the  
15 contrary, the Cole article teaches that the second metallization layer should overlie none of the  
16 insulating layer.”) (emphasis in original). In light of these contradictory references, the court finds  
17 that APT has failed to prove the obviousness of this combination by clear and convincing evidence.  
18 *See Monarch Knitting*, 139 F.3d at 881.

19  
20 b. Combining the IXYS Admitted Prior Art with the APT 208

21 As described in Section II.B.1., *supra*, a combination of the 208’s (or a similar patent’s)  
22 aluminum first metal layer with the remainder of the Korman invention—essentially the converse of  
23 the combination discussed at length in the text above—is infeasible; an aluminum first metallization  
24 layer is incompatible with the remainder of Korman’s high-temperature fabrication steps. *See* Helou  
25 Dec., Exh. 4, at 8:47-50; Blanchard Rebuttal Rep. ¶ 30(b). However, the IXYS admitted prior art  
26 discloses no such high-temperature fabrication techniques and presents no indication that it would be  
27 impossible to introduce an aluminum first metallization layer into those devices. *See generally* ‘715  
28



1 patent, Figures 1A - 1C & 3:5-65; '419 patent, 1 - 1C & 3:5-65. Indeed, this appears to be precisely  
2 what Dr. Zommer did in creating the patented invention. See, e.g., '715 patent, 5:23-27 ("The gate  
3 (G), however, is defined by a polysilicon gate layer 93, including portions overlying the channel and  
4 field region, on and in contact with a layer of oxide 95 and a first metallization layer 97 on and in  
5 contact with the polysilicon layer.").

6 The prior art provides several separate suggestions for one skilled within the art to import the  
7 APT 208's aluminum first metallization layer (and related structures) into the IXYS admitted prior  
8 art and place it beneath that device's extensive second metallization. The "Semiconductor  
9 Technology Handbook," authored by Richard Blanchard, provides an explicit suggestion to use  
10 aluminum as an "interconnection layer" in integrated circuits. See Helou Dec., Exh. 14, at 8.27  
11 ("Other metals that can be deposited by CVD for IC applications are molybdenum and aluminum,  
12 although these systems are not as well developed as is the CVD of tungsten."). Moreover, that same  
13 reference, published in 1985, describes a method of finding "the contact resistance between  
14 aluminum and either single crystal silicon or polysilicon," mirroring the IXYS patents'  
15 characterization of the invention's improvement. Compare Helou Dec., Exh. 14, at 9.10, with '715  
16 patent, 2:14-17 ("The improved device provides an interconnection for propagating device turn-on  
17 and/or turn-off signals, comprising substantially metallization over a polysilicon gated region.").

18 In addition—as noted in Section II.B.3. above—a plethora of other prior art references  
19 discuss and suggest the use of dual overlapping metallization layers, a feature that was evidently  
20 well-known and well-understood by individuals skilled in the art before the filing of the IXYS  
21 patents. See Helou Dec., Exh. 14, at 9.10 ("Via Resistance When dual layer metallization is used,  
22 the resistance from one layer of metal to another through the "via" is of concern."); Exh. 15, at 902  
23 ("Evolution and Current Status of Aluminum Metallization") ("In order to exploit fully the  
24 sophisticated device structures and processing which have resulted in substantial reductions in  
25 device size, it is frequently necessary to employ at least two levels of metallization (225). ... The  
26 presence of a second level of metallization requires careful attention to the vias and to crossover  
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1 areas for the two levels.”); Exh 16, at 1-2 (Neilson Expert Report) (discussing invention and design  
2 of dual metal devices according to varying specifications); Exh. 8, Figures 4E & 4G (Sasaki Patent,  
3 U.S. Patent No. 4,521,448) (teaching an invention that involves depositing a layer of aluminum gate  
4 metal, followed by an upper layer of metal patterned into “wiring strips”); Exh. 12 (“Fourth  
5 Generation Mosfets – Larger Die Size, Lower on Resistance”) (“At these higher frequencies, the  
6 closed cell polysilicon gate power MOSFETs are starting to have trouble switching fast enough ...  
7 The resistance is in the polysilicon which has a resistance of 30 to 60 ohms per square. ... A dual  
8 layer metal structure would be required for a closed cell....”). Beyond merely describing the general  
9 subject matter of the APT 208 and the ‘715 and ‘419 patents, these prior art references address  
10 directly the particular subject matter at hand—the use of an aluminum-over-polysilicon gate in a  
11 dual-metal device—with sufficient specificity to render such a combination obvious to one skilled in  
12 the art; these documents describe precisely what one of ordinary skill in the art must do to combine  
13 these inventions. In re Jones, 958 F.2d at 351. Because it would have been obvious to one skilled in  
14 the art to combine the APT 208—which captures all elements of the ‘715 and ‘419 patents save the  
15 extensive second metallization layer—with the similar structures of the IXYS admitted prior art  
16 (which suggests complete second metal coverage but lacks an aluminum first metal layer), the court  
17 finds that APT has proven by clear and convincing evidence that the inventions described in the ‘715  
18 and ‘419 patents would have been contemporaneously obvious to one skilled in the art. Monarch  
19 Knitting, 139 F.3d at 881. The court hereby finds ‘715 patent claims 1, 4, 5, 23, 26, 27, and 30, and  
20 ‘419 patent claims 1, 5, 6, 8, 9, 10, 11, 15, 16, 18, 19, and 20 invalid.  
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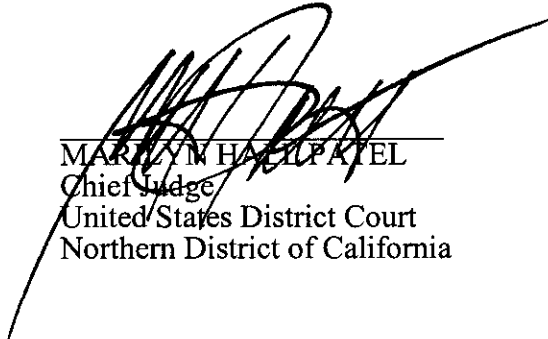
1 CONCLUSION

2 For the reasons set forth above, the court GRANTS defendant's motion for summary  
3 judgment of obviousness and GRANTS defendant's motion for summary judgment of non-  
4 infringement.

5 IT IS SO ORDERED

6  
7 Dated:

8 *June 15, 2004*

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MARILYN HALL PATEL  
Chief Judge  
United States District Court  
Northern District of California

## ENDNOTES

1. The background facts are drawn from the parties' moving papers, unless otherwise noted. The technology at issue in this litigation has already been described at length in prior orders issued by this court. For a detailed description, please see this court's original claim construction order, IXYS Corp. v. Advanced Power Technology, Inc., 301 F. Supp. 2d 1065 (N.D.C.A. 2004).
2. This amendment is representative of the other relevant claim amendments.
3. Even if the court were to find that IXYS had modified the "overlying at least said insulating layer" limitation in a fashion relevant to this motion, it still does not appear that IXYS surrendered any claim scope that would alter the outcome of this motion. See Festo, 344 F.3d 1367. The extended description of the claim amendment contained in Mr. Ogawa's letter to the examiner explains that the source and gate buses are not shorted to each other and then states that "[t]he gate bus portion of the second metallization layer contacts the first metallization layer through a gate contact opening in an insulation layer." Feeman Dec., Exh. 6, at 4. The letter is silent regarding whether or not the source bus contacts the first metallization layer. While IXYS might therefore be incapable of claiming infringement by any equivalents in which the gate bus does not contact the second metallization layer or in which the source and gate bus are shorted to one another, this amendment would not appear to preclude IXYS from claiming infringement by an equivalent—such as in APT's accused devices—in which the source bus contacts the first metallization layer.
4. The court understands the "function-way-result" test as, in some sense, simply a more robust method for evaluating the same questions of "insubstantial differences" and "hypothetical claims" placed at issue in the other tests.
5. It appears to this court that the conflict between Vehicular and Toro is nearly irreconcilable. The Toro court seems to have recognized this very fact, as it described Vehicular as having merely held that an accused device must perform every "key objective" of the asserted claims of the patented invention, not that a court should search the patent specifications when determining the functions of certain claim limitations. Toro, 266 F.3d at 1371. This represents a substantial rolling back of the reach of the Vehicular opinion, which derived the functions of the claim directly and explicitly from the specifications. See Vehicular, 141 F.3d at 1090-91. This court will generally hew to the mandates expressed in Vehicular, both because the very inquiry into a claim limitation's "functions"—as described by Warner-Jenkinson—seems to demand examination of the specifications which describe the *operation* of structural elements, and because Vehicular stands as the earlier precedent.
6. Though apparently it might be more difficult to bond a wire to these devices.
7. The court is dubious as to the veracity of this asseveration. APT cites two figures found within the '715 patent, Figures 1C and 2B, for support of this position. Figure 1C is a drawing of a prior art device, not of the '715 patent invention itself. See Feeman Dec., Exh. 1, at 3. In addition, APT's expert claims that Figure 2B shows the second metal source bus and the active area as co-extensive, and attempts to illustrate this point by simply applying a bluish shading to that entire area.

1 See Shenai Dec. ¶ 4. However, the “source bus” label in that figure is affixed not to the entire  
2 “active area,” but to the cross-hatched second metallization depiction that, at least in the figure itself,  
3 covers only a portion of the active area. See Feeman Dec., Exh. 1, at 5.

4 8. The parties agree that the second metallization need not cover the entirety of the device, since  
5 there are portions of the device (e.g. the “vias” connecting the gate bus and first gate metal and the  
6 spacing between the source and gate bus in the second metal layer) where no insulating layer that  
7 need be overlaid exists. See Def. Mot., at 7; Pl. Opp., at 6. The parties disagree as to the exact  
8 percentage of the substrate that must be covered with second metal, but for the purposes of this  
9 motion it suffices to indicate that this number is between 93% and 100%. See Shenai Dec. ¶ 24.

10 9. This question was left open by the court in its prior adjudication of APT’s motion for summary  
11 judgment of invalidity. See IXYS, 2004 WL 540513, at 9.

12 10. Dr. Blanchard apparently views the 546 die as representative of APT’s other allegedly infringing  
13 dies, the 846 and 1046.

14 11. IXYS’s argument maps well onto the “function-way-result” test described in Warner Jenkinson.  
15 Essentially, IXYS has identified improved current flow, and thus improved switching speed, as the  
16 “function” of the second metallization layer in the ‘715 and ‘419 patents. IXYS claims that APT’s  
17 accused devices perform this same function through the same means (a higher proportion of second  
18 metal coverage) and to the same result as IXYS’s patented devices, while the prior art  
19 devices—lacking a high percentage of second metal or other equivalent means—cannot switch  
20 current as rapidly and thus do not perform this function.

21 12. Although they do not say so directly, the opinions and calculations of Drs. Tsang and Shenai  
22 presumably apply as much to IXYS’s devices as they do to APT’s.

23 13. For the purposes of this aspect of APT’s motions, neither party has posited any distinction  
24 between the claims of the ‘715 and ‘419 patents.

25 14. To the extent that such a finding is necessary, the court finds that the APT 208 renders obvious  
26 all claim limitations of the IXYS patents other than the “overlying the insulating layer” limitation.  
27 Graham, 383 U.S. at 17-18.

28 15. This is particularly true in light of the fact that the 208 device contains the claim limitations that  
were used by the inventor to distinguish the ‘715 and ‘419 patents from the prior art before the patent  
examiner. Nathan Zommer’s patent claims were originally rejected because the examiner believed  
that the combination of the Korman and Jones patents “taught a polysilicon gate with an overlying  
metallization layer.” Helou Dec., Exh. 24, at 4. Zommer argued back to the examiner that Korman  
and Jones could not be teaching the use of a first metallization layer “comprising aluminum,”  
because the processes described in the Korman patent involved fabrication temperatures that would  
melt aluminum. Id. (“However, Korman et al. still fail to teach the use of the claimed first  
metallization layer comprising aluminum....”) (emphasis in original). The parties do not dispute that  
the 208 device employs a first metallization layer comprising aluminum, and thus the presumption of

1 accuracy on the part of the examiner is inapplicable here.

2 16. IXYS argues at various points that a prior art reference must “necessarily” or “inherently”  
3 require the claim element that is believed to have been rendered obvious and makes much of the fact  
4 that (in its opinion) APT’s prior art references do not meet this rigorous standard. Yet in attempting  
5 to describe this standard for finding a patent invalid because obvious, IXYS has erroneously cited  
6 this court to several cases discussing the standard for invalidity by anticipation, not by obviousness.  
7 Compare Trintec Indus., Inc. v. Top-U.S.A. Corp., 295 F.3d 1292, 1295 (Fed. Cir. 2002) (“Inherent  
8 anticipation requires that the missing descriptive material is ‘necessarily present,’ not merely  
9 probably or possibly present, in the prior art.”) (citations omitted); Rosco, Inc. v. Mirror Lite Co.,  
10 304 F.3d 1373, 1380 (Fed. Cir. 2002) (same), with Al-Site, 174 F.3d at 1323 (holding that the  
11 moving party “must show prior art references which alone or combined with other references would  
12 have rendered the invention obvious to one of ordinary skill in the art at the time of the invention.”).  
13 A plaintiff who seeks to prove invalidity for obviousness need not meet so stringent a standard. See  
14 id. Consequently, IXYS’s claim that (for instance) “[t]he figures of Korman do not clearly show that  
15 the single aluminum layer overlies the entire insulating layer,” even if true, would be far from  
16 dispositive of this issue.

17 17. Figure 3 identifies an “interlayer,” which presumably functions as an insulating layer in the  
18 Jones device.

19 18. This prior art also may not meet the “high-frequency power MOSFET” limitation or other such  
20 restrictions, but this matter is irrelevant for present purposes as those limitations are met by the APT  
21 208 device.

22 19. IXYS contends that APT never suggested combining these references in this fashion in its  
23 invalidity contentions, as required under Patent Local Rule 3-3, and thus claims that APT should be  
24 precluded from relying upon this combination at this stage of the proceedings. (In fact, in its  
25 invalidity contentions APT suggested precious few of the myriad combinations of prior art  
26 references it now alleges invalidate IXYS’s patents.) The court is not unsympathetic to IXYS’s  
27 concerns. However, the Korman and Jones patents have been at issue from the moment IXYS’s  
28 patent applications were filed (as has IXYS’s admitted prior art, for obvious reasons), and the APT  
208 device has been a principle subject of this litigation (for purposes of invalidity) for quite some  
time now; in fact, it was one of the few devices whose mask layer data APT provided to IXYS in a  
timely fashion. While APT’s motion makes clear that it has not complied fully with the letter of the  
local rules, the court finds that IXYS has long been on notice of these potential combination. In the  
interests of privileging substance over form, the court will proceed to address these most  
pertinent—and most well-known—of combinations.

20. Hereinafter, the court will use descriptors such as “combining Korman and Jones with the APT  
208 device” to indicate generally a combination of a power MOSFET that lacks a second  
metallization layer overlying at least the entirety of the insulating layer with a similar device that  
includes that crucial claim limitation. The court is certainly not insisting upon a specific suggestion  
to combine Korman with the APT 208.

1 21. The APT device mentioned in this article is a single metal, rather than dual metal, device. The  
2 principle of employing less metal coverage nevertheless translates by analogy from this single metal  
3 situation to the dual metal context relevant here.  
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